SPRAY DRYING OF INDUSTRIAL HEMP WITH MALTODEXTRIN AND GUM ARABIC

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Abstract
The goal of this study was to obtain industrial hemp powder that is stabile and high-quality with regard to physical-chemical properties. The impact of two different carriers in spray drying and their concentrations on the quality and stability parameters of extracts from aerial parts of *Cannabis sativa* L. was investigated.

Introduction
Industrial hemp (*C. sativa* L.) belongs to the family of *Cannabaceae* and originates from humid and hot climates of central and southern Asia. Industrial hemp represents an important material in the production of paper and construction materials. Moreover, it is present in folk medicine for treating different disorders and medical conditions. *C. sativa* has long been in focus of the scientific community, therefore, its numerous pharmacological properties have been confirmed, such as: antimicrobial, antioxidant, antiemetic, antiproliferative, and analgetic activity. The most significant components of industrial hemp with attributed pharmacological potential are cannabinoids. Apart from cannabinoids, industrial hemp possesses other significant bioactive components of non-cannabinoid structure [1].

Experimental
Liquid plant extract was dried using spray drying with inlet temperature 120-130°C and outlet temperature 80°C. Drying was conducted without carriers and with addition of carriers ((MD and GA) in two concentrations (50 and 120%). The obtained powders were characterized in term of physical and chemical properties (moisture content, higroscopicity, bulk volume, WAI, WSI, total phenols, and flavonoids content).

Results and discussion
Drying without carrier was not efficient and the produced powder was sticky, while it was noticed that the efficiency of drying increased with the addition of both MD and GA. Furthermore, drying with 50% GA resulted in 58% process efficiency, whereas higher GA concentration increased the efficiency up to 72.3%. In addition, using MD 120% was significantly less adequate compared to 120% GA with achieved efficiency of 47.73%.
It was recorded that powders prepared with 120% of carrier had an approximately two-fold lower moisture content than powders obtained with 50% of carrier (3.82% and 4.38%, for MD and GA, respectively). These results confirmed the stability of powders and demonstrated their lower affinity to microbiological contamination. Additionally, it was observed that the addition of MD and GA decreased phenols content due to the dilution effect. GA demonstrated to be a more adequate encapsulation carrier as it preserved a higher amount of phenolic compounds. An opposite trend was observed with the flavonoids content where a higher concentration of the carrier was more appropriate.

Conclusion

Obtained hemp powders with a higher carrier concentration were of better quality with respect to moisture content making their storage, packaging, and distribution easier compared to powders with 50% carrier. Moreover, GA demonstrated to be a more favorable agent for obtaining industrial hemp powders.

Acknowledgements

This research was funded by Serbian Ministry of Education and Science; Project No. 451-03-68/2020-14/200134.

References

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